



TV that Greets You: Adding Sensors

Written By: Chandler

TOOLS:

- [Wire stripper/crimper \(1\)](#)

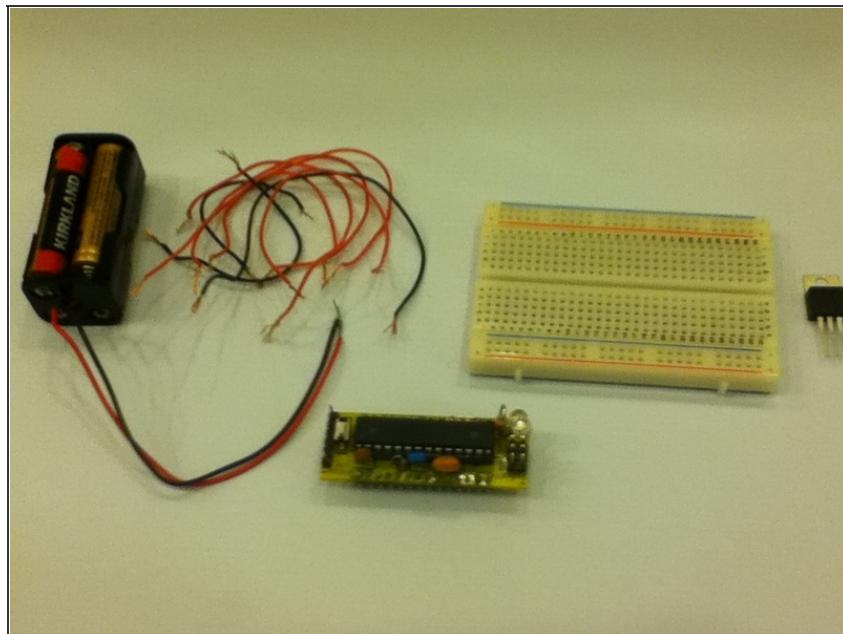
PARTS:

- [PIR sensor \(1\)](#)
- [22 awg wire \(1\)](#)

SUMMARY

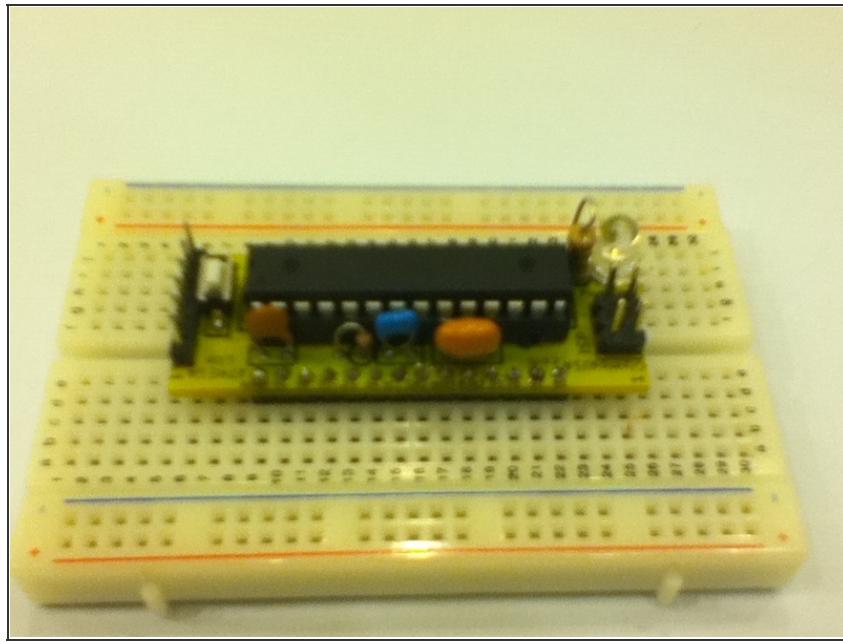
In this project, we will wire in a sensor and add a program that I made myself, so that our TVs greet us when we walk in the room. However, make sure that you have done my previous tutorial that teaches how to use an Arduino clone with a TV, and my first one, which teaches how to get set up with an Arduino clone.

Step 1 — Get Started with Arduino Clones



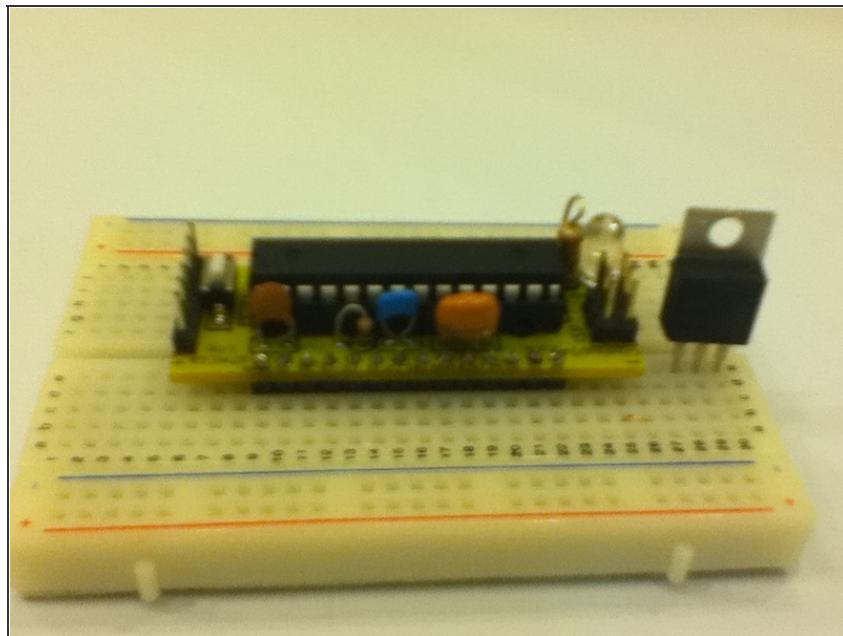
- **WARNING: ATTEMPT AT YOUR OWN RISK!** I have found that my Arduino clone is partially dysfunctional (will run TV and LED, but not speaker or LCD). Here are the parts that you will need. They are, from left to right, a 6 or 9 volt battery pack, misc. wire, an Arduino clone, a breadboard, and a 7805 voltage regulator.

Step 2



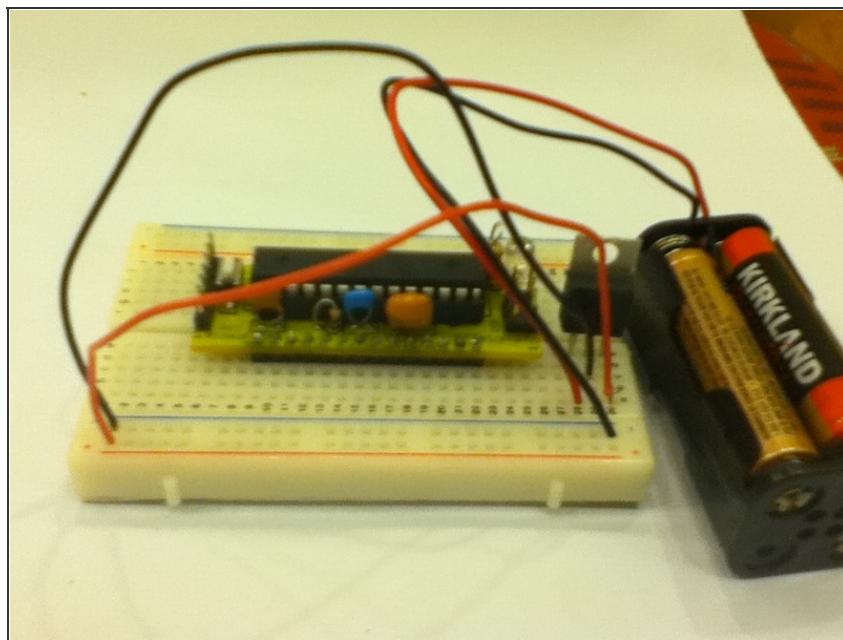
- Place the Arduino clone on the breadboard, with one row of pins on either side of the breadboard.

Step 3



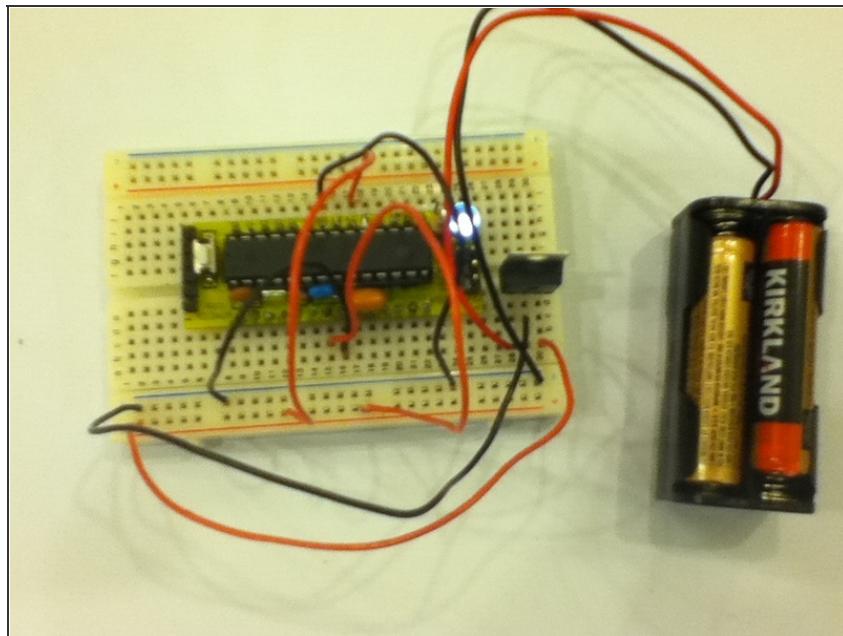
- Now, on the "front" side of the breadboard, next to the Arduino clone, place the 7805 chip with the heatsink facing away from you.

Step 4



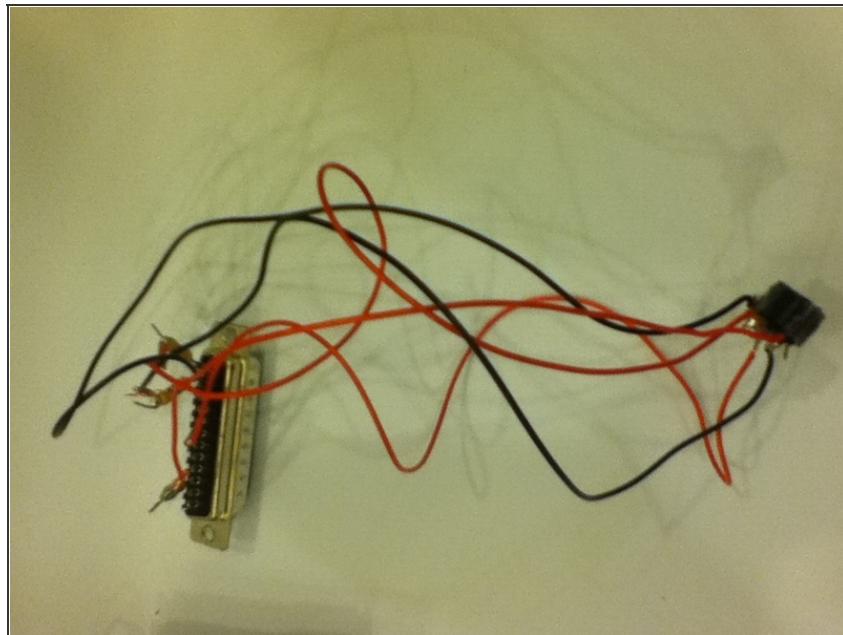
- Next, let's hook up the battery pack. Put the positive (red) probe into the same row as the far left pin of the 7805, and put the negative (black) probe into the negative bus (the line of pins with the blue line over it). Also, run a wire from the row with the middle pin of the 7805 to the negative bus, and run a wire from the right pin to the positive bus.

Step 5



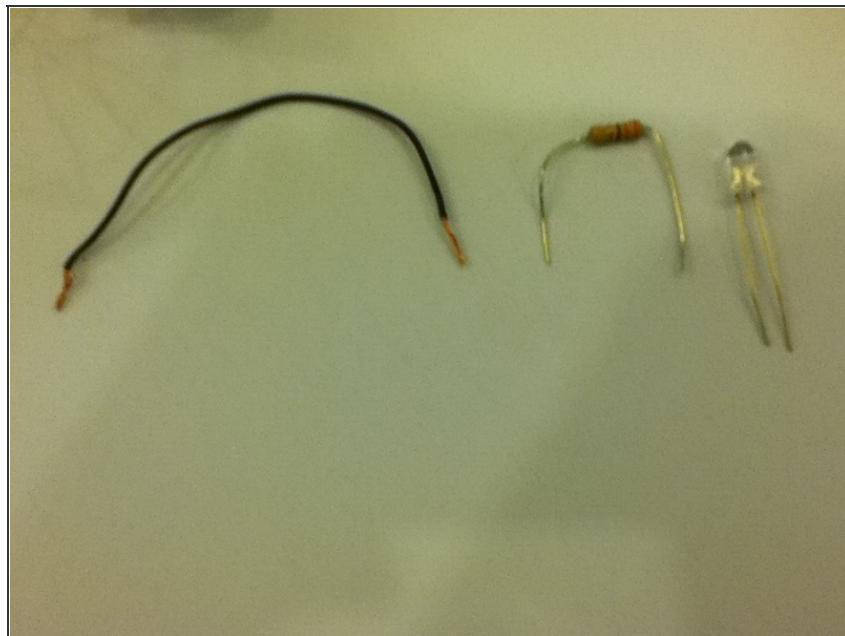
- It's starting to get a tad more complex. Run wires from the positive bus to the rows with the pins labeled "VCC" and "AV," and run wires from the negative bus to the rows with both of the "GND" pins.

Step 6



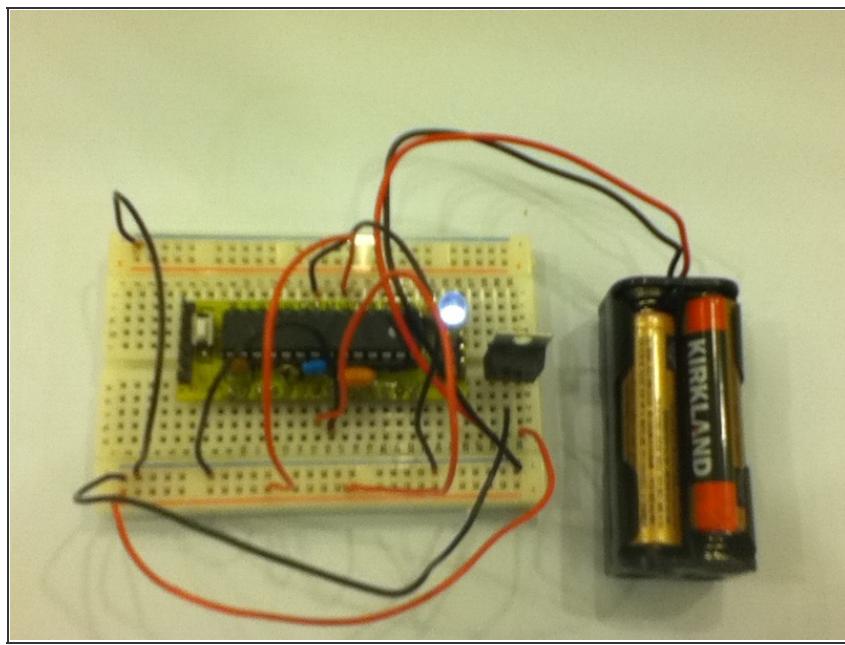
- Nice job! The LED on the board should light up. If it doesn't, make sure that you have done all of the steps correctly, and that you soldered your clone correctly. Now, assemble a "parallel programmer," which is a device that hooks into a Windows or Linux computer (if it originally ran Windows) that will program this device. If you have a AVRISP or other programmer, then use that instead. [Here](#) is how to build a parallel programmer.

Step 7



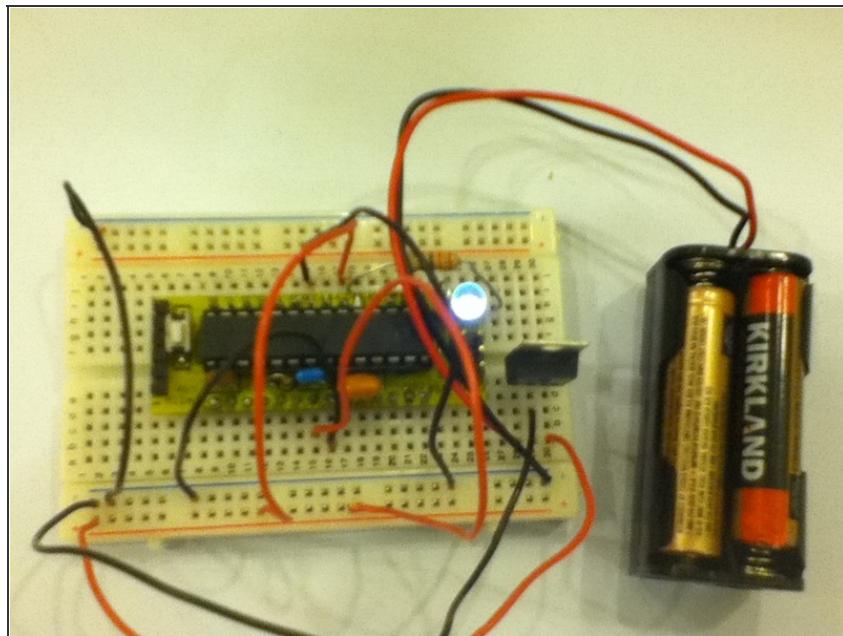
- Now, let's build our first project! Collect the parts shown (LED, wire, and 330 ohm resistor).

Step 8



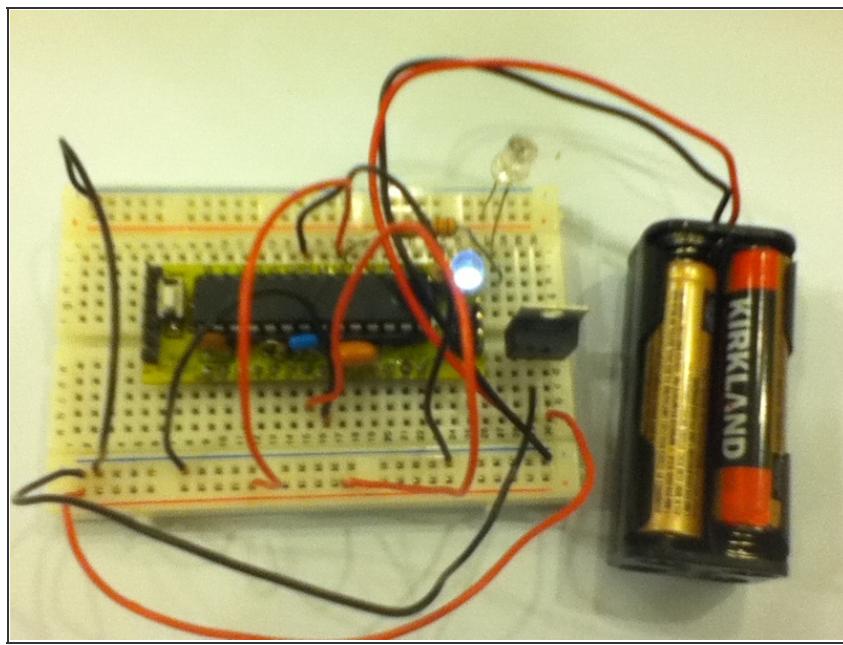
- See the wire on the right? Connect a wire from one negative bus to the other.

Step 9



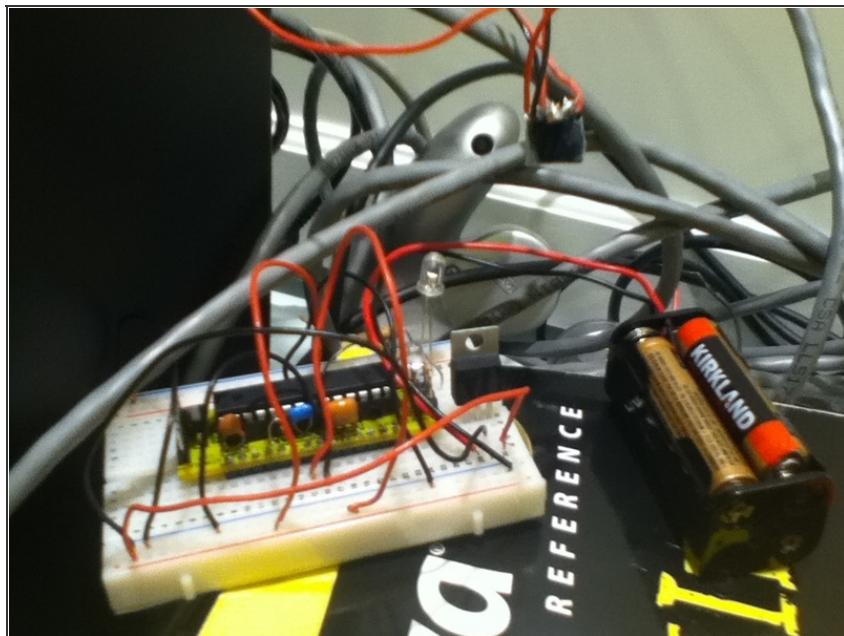
- Now add a resistor from either pin 13 or pin B5 (depending on the model of your Arduino clone), and connect it off to a row with nothing else on it.

Step 10



- Last step before programming: place the long (+) probe of the LED into the same row as the resistor, and the short (-) probe into the new negative bus.

Step 11



- Here's an easy step. Once the parallel programmer is finished, just hook in into the back of your computer, and into the ISP pins on the Arduino clone (the 2x3 array of pins on the Arduino clone).

Step 12

- Now to working with the computer. On Windows, open Program Files, open the Arduino folder, and go into /hardware/Arduino/boards. (For Mac, check Applications, and for Linux, check where you installed it). Now, add this to the bottom of the file (retype it, it doesn't copy correctly).

```
atmega328pp.name=Arduino Clone with Parallel Programmer
atmega328pp.upload.protocol=stk500 atmega328pp.upload.maximum_size=30720
atmega328pp.upload.speed=57600 atmega328pp.upload.using=parallel
atmega328pp.bootloader.low_fuses=0xFF atmega328pp.bootloader.high_fuses=0xDA
atmega328pp.bootloader.extended_fuses=0x05 atmega328pp.bootloader.path=atmega
atmega328pp.bootloader.file=ATmegaBOOT_168_atmega328pp.hex
atmega328pp.bootloader.unlock_bits=0x3F atmega328pp.bootloader.lock_bits=0x0F
atmega328pp.build.mcu=atmega328p atmega328pp.build.f_cpu=16000000L
atmega328pp.build.core=arduino
```

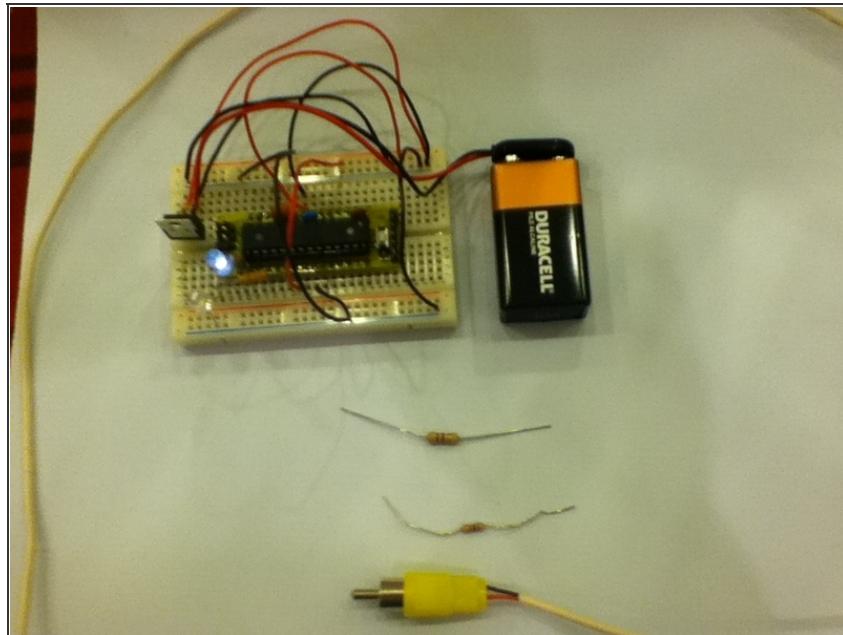
Step 13

- Now, open the Arduino IDE (get this from <http://arduino.cc>), go into Tools -> Board, and select the option "Arduino Clone with Parallel Programmer."

Step 14

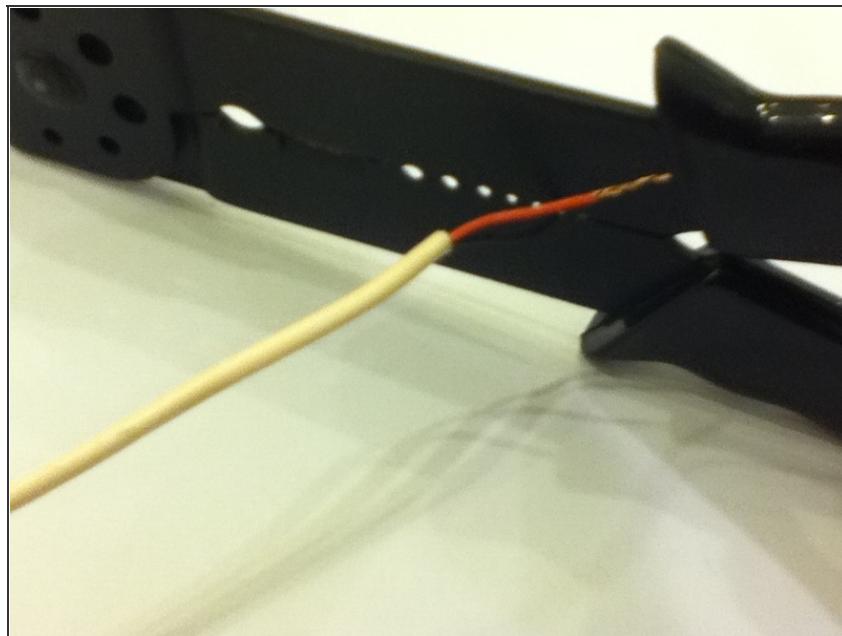
- Finally, open the Blink program in the IDE (Open button, Basics, "Blink"), and download it onto the Arduino clone (Download button). If you are lucky, then you should be able to unplug the parallel programmer, and the LED should blink! Note: if you got any errors, make sure that the parallel programmer is not touching anything on your board and that you followed these steps correctly.
- Congratulations! Look at the Arduino sample code and the tutorials on this website. For future reference: the pin that says "B0" = pin 8, "B1" = pin 9, etc.

Step 15 — Use an Arduino Clone to Control a TV



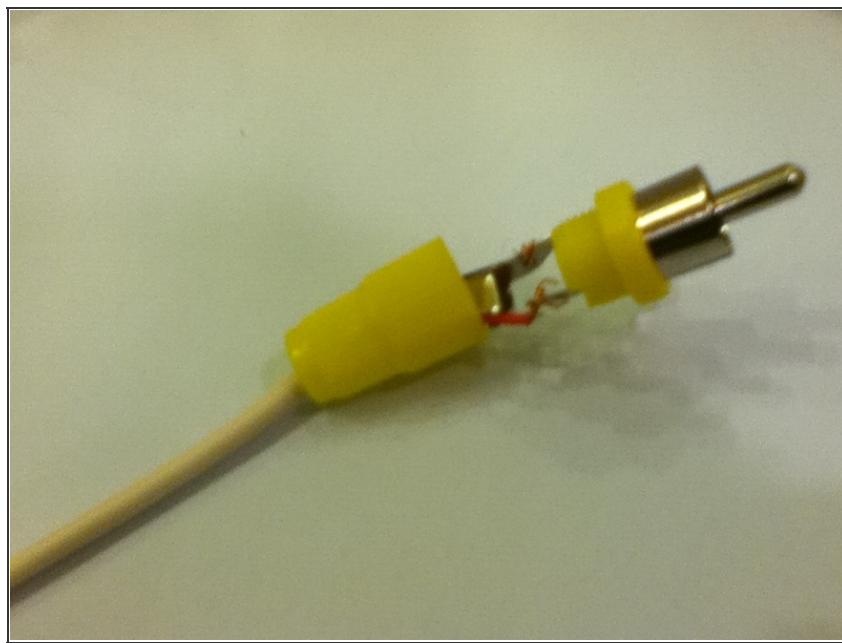
- Welcome back! Gather the following parts:
- Arduino clone from *Getting Started with Arduino Clones* project
- 2 resistors: 1k and 470
- Solder-type RCA cable
- Wire

Step 16



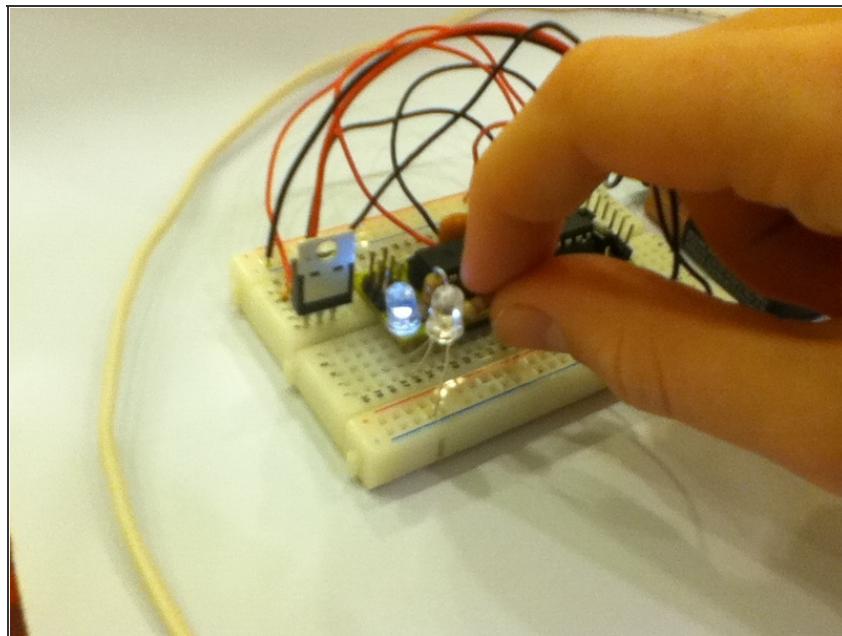
- Assuming that the wire is speaker wire or similar wire with 2 wires inside coating, strip the coating off of the wire, and strip both of the wires inside.

Step 17



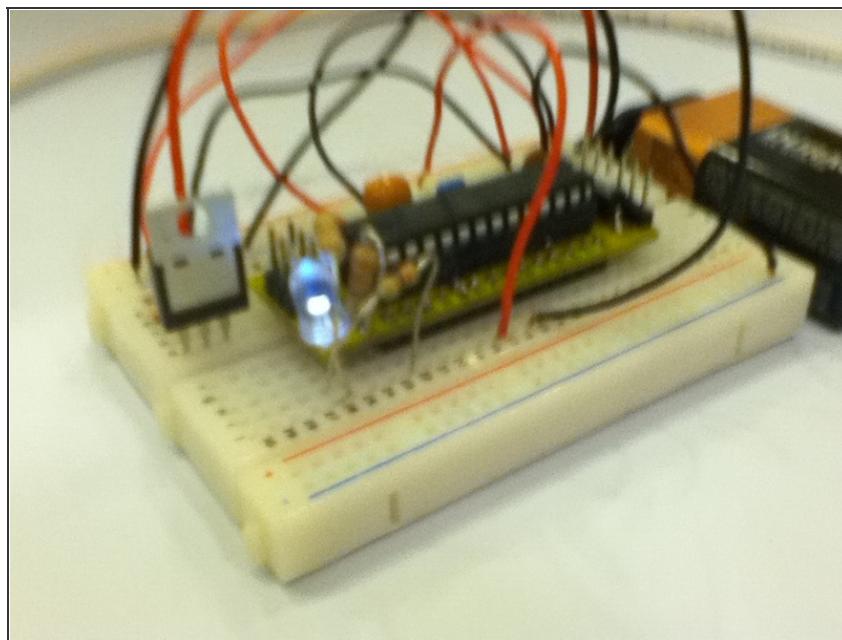
- Connect the wires to the RCA cable. The black (-) wire goes to the taller connection, and the red (+) wire goes to the shorter connection.

Step 18



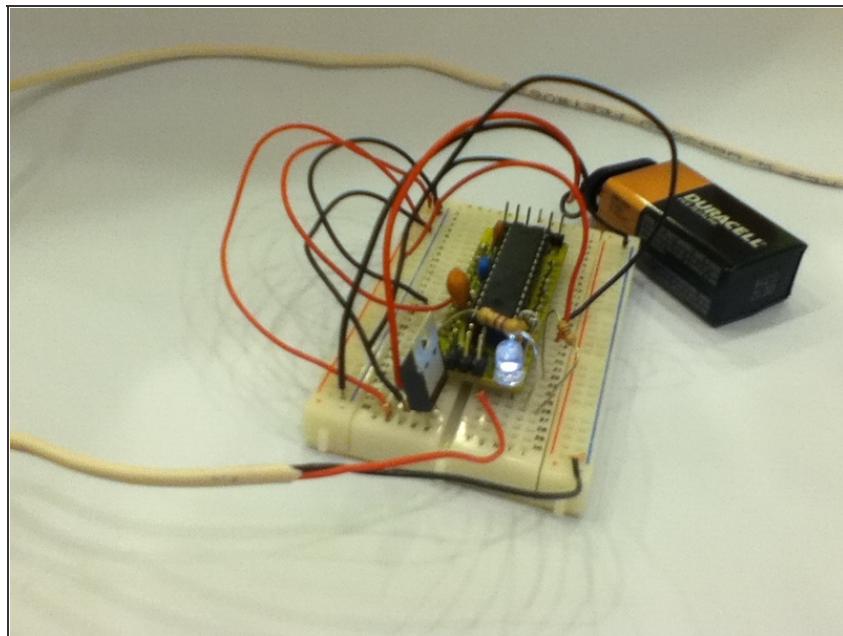
- Before we start wiring, get rid of the LED and resistor from the previous project.

Step 19



- Connect the 470 ohm resistor to digital pin 7 (D7), and the 1k ohm one to B1, or pin 9. Make their other ends go into the same unused row off to the side (sorry that the LED assembly is still on there in the picture).

Step 20

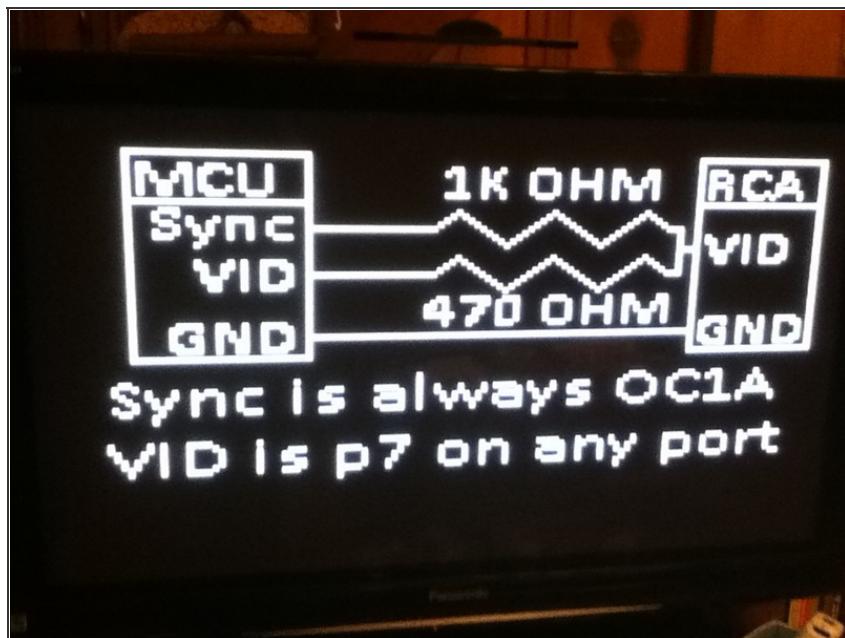


- Now, connect the RCA cable. The black wire goes to the negative bus, and the red wire goes in the same row that has the 1k and 470 ohm resistors both connected to it.

Step 21

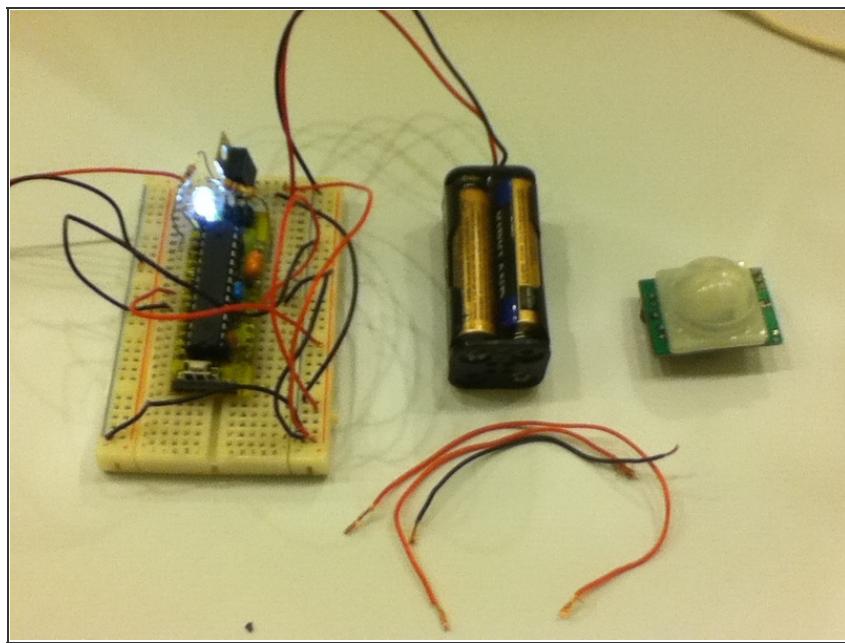
- Program the Arduino clone, as in the previous project, with the NTSC demo code that comes with the TVout library, available [here](#). (To install the code, just click the Open button in the Arduino IDE, and go to "TVout." Click on the code that you want to open. Then click the download button.)

Step 22



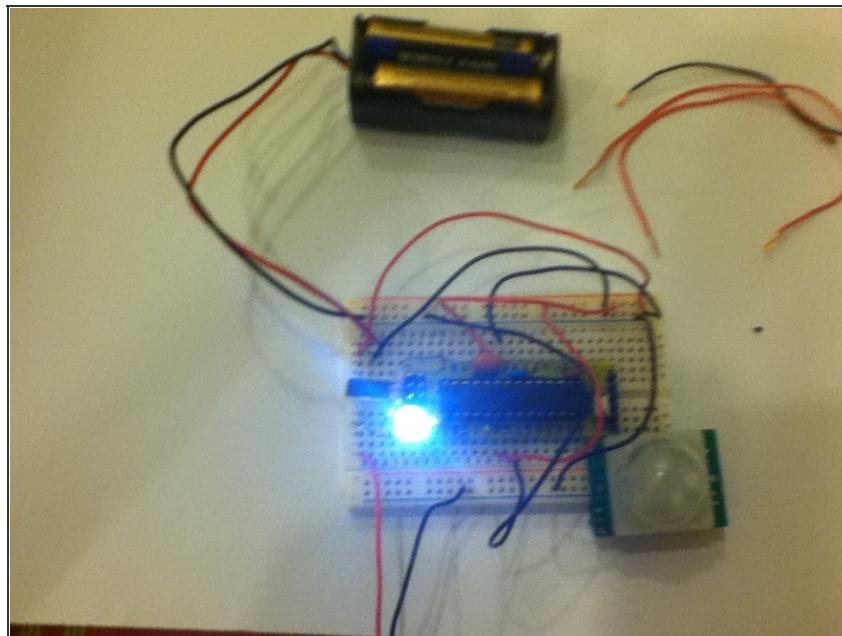
- Now, hook the yellow RCA cable up to the yellow input on your TV, and turn your TV to channel 2 or 3, depending on your TV. An image should appear, and your project should work! To restart the video, press the reset button on your Arduino clone.

Step 23 — TV that Greets You: Adding Sensors



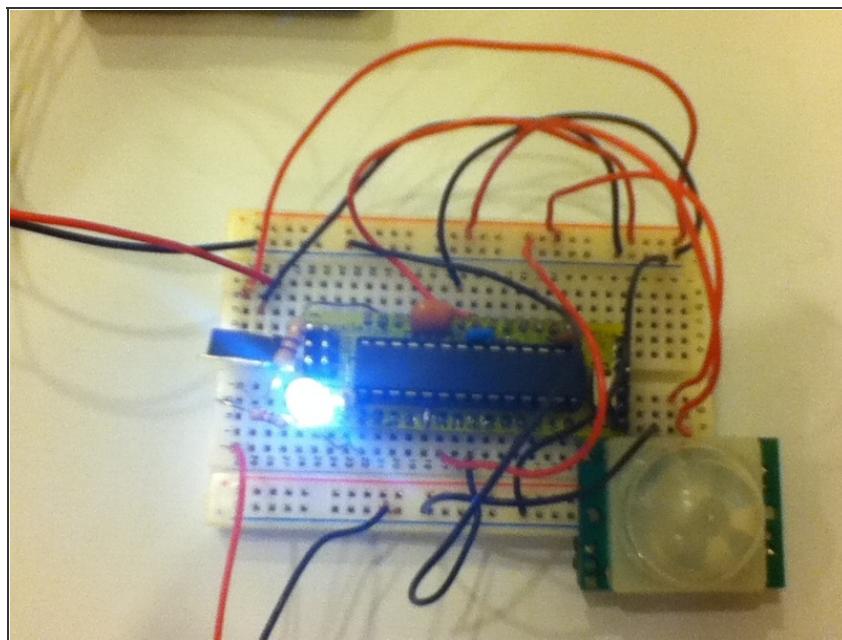
- Collect these parts: The result of the previous project, a RadioShack PIR module, and some wire.

Step 24



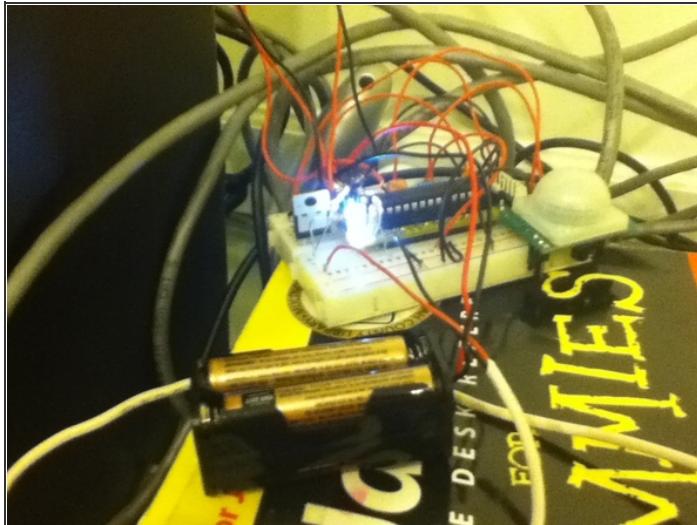
- Now, simply place the PIR module into the corner of the breadboard, with the pins in their own rows. You may have to scoot some wires over in the positive and negative buses.

Step 25



- Now let's wire the PIR module. Run a wire from the leftmost pin to ground, a wire from the middle pin to +5V, and a wire from the right pin to pin A0 (analog 0).

Step 26



```

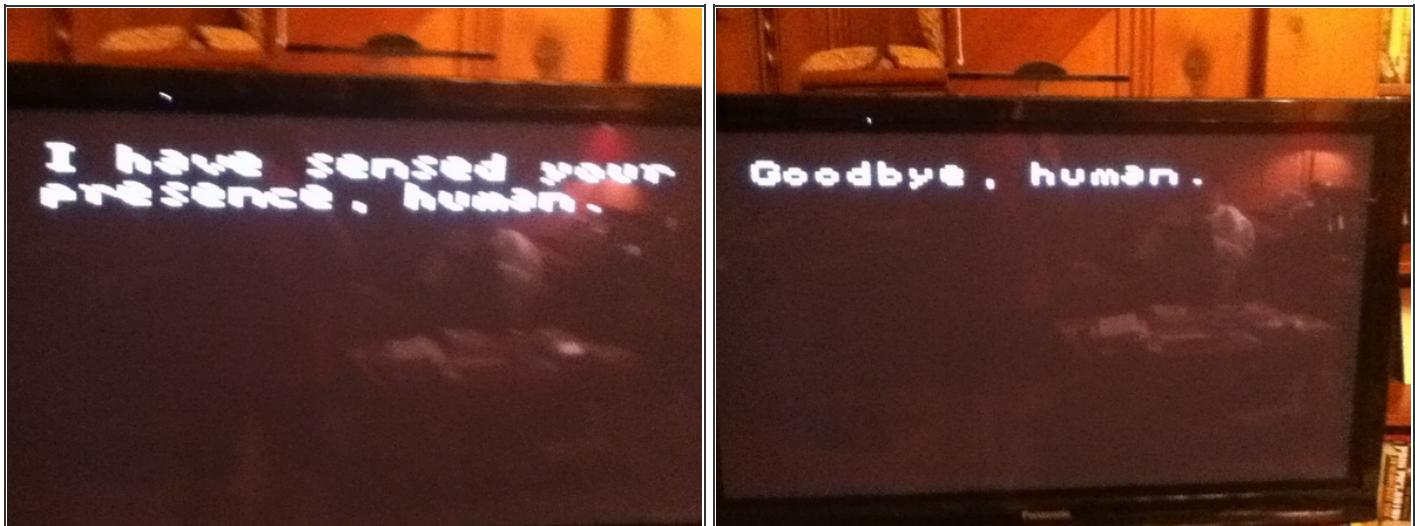
void setup(){
  myTV.begin(NTSC, 120, 96);
  myTV.select_font(font6x8);
}

void loop(){
  if(analogRead(0)>400){
    myTV.println("I have sensed your presence, human.");
    myTV.delay(1000);
    myTV.clear_screen();
  }
  if(analogRead(0)<400){
    myTV.println("Goodbye, human.");
    myTV.delay(1000);
    myTV.clear_screen();
  }
}

```

- Now let's program this project! Download the following code onto your Arduino clone.
- #include <font6x8.h> #include <TVout.h> TVout myTV; void setup(){ myTV.begin(NTSC, 120, 96); myTV.select_font(font6x8); } void loop(){ if(analogRead(0)>400){ myTV.println("I have sensed your presence, human."); myTV.delay(1000); myTV.clear_screen(); } if(analogRead(0)<400){ myTV.println("Goodbye, human."); myTV.delay(1000); myTV.clear_screen(); } }
- Sorry that it's crammed into one line. You can piece it together, or use the attached image. Note that on the image, the two lines
 - #include <TVout.h>
 - TVout myTV;
 - were cut off. Also, the long line says
 - myTV.println("I have sensed your presence, human");
 - Sorry for the inconvenience.

Step 27



- Finally! Now it's as easy as plug-and-play. Just plug the yellow RCA cable into your TV and watch!

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